

Energy Transfer Modulation between P3HT and ZnO Nanorods for Hybrid Solar Cells

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Solar cells based on organic and polymer materials have become promising candidates for solar energy conversion because they have potential advantages of low-cost, light weight, and flexibility. However, polymer solar cells have not yet reached the level of practical use because of their lower efficiency due to several limitations of low-charge mobility and short exciton diffusion length.

It has been suggested that ZnO nanorods can be used to improve charge carrier collection and transport in the bulk heterojunction polymer solar cells because the hybrid structures offer the direct and ordered path for carriers to electrodes. We synthesized ZnO nanorods (diameter <20nm, length~200nm) using a hydrothermal approach and investigated the transfer efficiency of photoexcited electrons from P3HT to ZnO nanorods. To modulate the energy transfer, we modified the surface of ZnO nanorods by porphyrin dyes or PCBM, and studied effects on charge separation efficiency.

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